

Virginia City Hybrid Energy Center
Response to Data Request
Bruce Buckheit, Member, Virginia Air Pollution Control Board

Question (Page No. 16-17):

The MACT Analysis assumed that 99.9% control efficiency for cobalt and lead; 99.8% for arsenic, beryllium and manganese; 99.7% for antimony (and lesser amounts for other metals) were needed for compliance with MACT limits. It then determined that particulate matter is “an excellent surrogate for metal HAP and has been used in several promulgated MACT standards” and determined to use the PM, PM₁₀ and PM_{2.5} limitation for all metal HAP. However, I have found nothing in the record that translates the assumed 99.9% control efficiency into a PM MACT limit or evaluates the proposed PM limits from this facility as against the MACT metal limits discussed above.

Response:

As USEPA has indicated for other source categories, particulate emissions are an effective surrogate in lieu of establishing standards for the individual metals. Based on use of particulate as surrogate for other HAP metals, the estimated control efficiency of the combined technologies is expected to be in excess of 99%. PM emissions from any given fabric filter are generally constant since a filter is a static control device, and the control efficiency is what varies depending on the particulate loading to the filters. As such, it is appropriate in a MACT determination (or BACT analysis) for particulate emissions (as a surrogate for MACT), to compare PM emission limits and not PM control efficiencies.

The potential emissions of HAP metals were estimated using procedures defined in "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress," U.S. EPA, February 1998. These procedures allow for the estimation of emission factors for each HAP metal based on the coal type and location (i.e., Virginia bituminous coal), boiler type (i.e., circulating fluidized bed boiler), and specific add-on controls (i.e., dry FGD in combination with fabric filter). Therefore, these procedures can provide a HAP metal emission factor for the typical regional coal, specific boiler type, and control technologies proposed for the Project.

Because the proposed controls are as effective as those applied to the best similar source, fabric filtration is considered MACT for the other HAP metals. Rather than establish emission limits for individual HAP metals, Dominion proposes that the particulate emission limit be used as a surrogate for other trace metal emissions. Using PM as a surrogate for this project is appropriate due to the relatively low exhaust temperatures in the fabric filters of approximately 165° F (metals are not expected to be in vapor form). The potential HAP metal emissions and estimated removal efficiencies are summarized in Table 2. The basis for the specific HAP metal emissions commented on then is discussed in the attachment.

The proposed PM limit of 0.012 lbs/mmBtu in the MACT permit represents a control efficiency of 99.91% based on the design coal characteristics (ash content) and the fly ash to bottom ash

split (60/40). This efficiency increases with an increase in the fly ash to bottom ash ratio, i.e. more fly ash to the baghouse with a constant emission rate.

The 0.012 lbs/mmBtu TOTAL PM limit is the lowest of any CFB in the country with the exception of Reliant Seward (0.01 lbs/mmBtu). However, Reliant Seward has been unable to consistently achieve compliance with the limit. Therefore, a PM limit of 0.012 lbs/mmBtu has been determined to represent MACT for the HAP metals. Assuming the metals are not in vapor form, the fabric filters are expected to capture the metals at the efficiencies referenced in Footnote 2 on page 8.